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# Effect of temperature on the evolution of structure, crystallographic texture and the anisotropy of strength properties in the Ti grade 4 alloy during continuous ECAP

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## Abstract

© 2015 Advanced Centr Co. Ltd. This paper presents the results of experimental studies on the evolution of structure, crystallographic texture and the anisotropy of strength properties in the volume of Ti Grade 4 billets subjected to continuous equal-channel angular pressing (ECAP). Continuous ECAP is performed at temperatures of 200° 400° and 450° with 1 to 8 passes, using route BC. The methods of X-ray diffraction analysis are employed to investigate the effect of processing regimes and strain degree during continuous ECAP on the structure of the material under study. As a result of computer modelling of the crystallograpic texture evolution, the regularities in the formation of preferred orientations and the anisotropy of strength properties are established, and the activity of various slip systems and twinning systems in titanium billets, depending on the number of ECAP passes, is evaluted. Estimation of the anisotropy of strength properties, based on building of yield contours, shows that an increase in the number of passes of continuous ECAP promotes the formation of a more isotropic structure. The obtained results allow to explain and predict the deformation behavior of nanostructured Ti Grade 4 with consideration of its microstructure and crystallographic texture parameters.